HOSPITAL EVOLUTION IN THE VICTORIAN ERA.

OLD AND NEW IDEAS AS TO HOSPITALS.

AMONG the modes adopted for celebrating the fact that the Queen's reign has now exceeded in length that of any of her predecessors, schemes for benefiting the hospitals of the country, and especially those of London, occupy so large a place that one is tempted to cast one's thoughts backward, and consider how different was the position of these institutions at the time when Her Majesty ascended the throne from that which they occupy now, after her reign of sixty years.

The changes which have happened during these years have been so various and so great, and the conditions of life at the present time are, in many ways, so absolutely different from what they were at the beginning of the reign, that it would be idle to suggest that the growth of the hospital idea is the most striking event of the period. Nevertheless, those who have taken the trouble to observe the social changes which have occurred around them during recent years can hardly have failed to be struck by the great alteration which has occurred in the view taken by the people in regard to entry into the hospitals, and by hospital managers in regard to the standard of comfort and of medical relief which it is proper to offer to hospital patients.

The old idea that a hospital was to be looked upon as an asylum or refuge from the buffetings of the outer world has died away, and given place to the modern notion that it is a great and complicated piece of machinery, every detail of which, however obscure at first sight its meaning may appear, has for its aim and object the cure of the patient and his restoration to health.

The elaborate system of nursing, the constant visits of the medical officers, the great frequency of operations, the continuous tabulation and comparison of results, and lastly, the very shortened stay of patients in hospitals nowadays, all point to the fact that these institutions are no longer looked upon as places of refuge, but as places of cure; and this, undoubtedly, is the key by which are to be explained many of the changes which have taken place in their construction, in their management, and in the character of the cases which are now admitted to their wards.

It is impossible to understand the reasons for all the changes which have taken place in hospital construction and in hospital management during the Victorian era, unless we bear in mind some of the great changes which have at the same time occurred in the social and economic condition of the poor, for whose relief these hospitals were intended.

THE SOCIAL CONDITION OF THE POOR.

The poor we have always with us, and even now, no doubt, a large number of the labouring classes are very poor. But we do not now see what those did who lived in 1832—viz., a whole country steeped in poverty, and a Poor Law so arranged that it was next to impossible for those who had received its dole again to rise to independence.

It was in the early part of the last century that workhouses were established and that the workhouse test was introduced, those who refused the shelter of the poorhouse being struck off the poor's roll and refused relief. But towards the end of the century a great relaxation took place in the rigour with which the Poor Laws were administered. In 1796 the workhouse test was removed, and from that date onwards outdoor relief became the rule. The effects of this change were disastrous. In many places it was soon found that pauperism swallowed up three-fourths of the rent, and it became an almost universal custom for relief to be given to ordinary labourers, thus lowering the current rate of wages to such an extent that no man could live on them alone, and that it became next to impossible for anyone to rise above the almost universal pauperism which was the rule throughout the country districts.

In 1834, as the result of a report by a Royal Commission appointed to inquire into the whole matter, the Act was passed under which the poor relief is now administered; and so it happened that when Her Majesty ascended the throne, in 1837, the poor of the country were just settling down to the new condition of affairs—one of which conditions was the use of workhouses as a deterrent to pauperism.

We cannot wonder, then, that the voluntary hospitals of the country, admission to which was almost universally by ticket, became filled with the *protégés* of the subscribers; chronic cases needing an asylum rather than acute cases needing treatment. And perhaps one of the most striking changes which has come over the hospitals, taken as a whole, during the past sixty years, is the elimination of the "chronics" and the filling of the wards with cases of acute disease requiring constant supervision or investigation, and more especially the vast increase which has taken place in the amount of surgical work which is now being done under their roofs.

This change, however, was far from being a sudden one, and, in fact, the old system cannot be said to be dead even yet.

WHY DEFECTIVE HOSPITALS REMAINED HEALTHY.

In a report on the hospitals of the United Kingdom, made to the Privy Council in 1863 by Dr. Bristowe and Mr. Holmes, the effect of the ticket system of admission on the character of the cases received by hospitals is well described. These authors say that in the country districts of England the hospitals are reserved for the chronic cases.

"In many country hospitals the beds are taken for some time beforehand. In many the subscribers would not think they obtained fair value for their subscription unless their nominee was admitted, however little prospect there might be of his receiving more benefit by treatment at the hospital than at home, and not only admitted, but kept for the full 'term,' as it is called; that is to say, the time during which the letter is good. The consequence is, and must be, that the hospital is looked upon amongst the poor as a private charity, so far as the disease is concerned, and admission into it is sought through private channels, just as into an almshouse; in fact, these country hospitals have become in great measure sick clubs in which the employer pays instead of the patient. . . . Such a hospital, therefore, usually contains a few grave accidents requiring surgical operation amongst a much larger number of chronic invalids who have little more influence on the sanitary condition or the atmosphere of the hospital than if they were in a condition of health. Another effect of this strict adherence to the letter system is that the hospital is seldom if ever full. It is for these reasons we conceive that many country hospitals are said to be "very healthy," and we have no doubt that they are so, although they utterly violate all the rules of construction which experience has shown to be necessary in hospitals for acute disease, and the violation of which in the case of such hospitals is promptly followed by the outbreak of hospital diseases."

The great change in the character of the work done in hospital wards which, in 1863, had not yet materially affected the country hospitals, the change that is caused by their invasion by acute cases and especially by cases of operation, had at that time already taken place in the larger hospitals of our great towns, and had already culminated in the production of such a death rate as to have drawn attention to the question of their sanitary condition.

WANT OF EXPERIENCE AS TO ESSENTIAL CONDITIONS OF CONSTRUCTION.

The fact has to be recognised that the healthiness of a hospital, under ordinary conditions, is no proof of its being properly constructed, and there is very little doubt that many of the erroneous ideas as to the planning and construction of hospitals which were current in the first half of the present century, were due to the fact that but few of the existing hospitals had been used to the full or had been subjected to that strain which was necessary to show wherein lay their weak points.

From this, it happened that architects were allowed to exercise their sweet will in the erection of buildings pleasing to the eye and admirably fulfilling the purpose of providing monumental "public buildings," but most unfitted for standing the strain of being crowded with operations and acute cases.

Nor could they be blamed. Even in the medical profession there was a considerable dread of fresh air, and the public

looked upon it as anathema. Moreover, the older hospitals gave but little clue to the conditions necessary for the maintenance of health under the new conditions, and finding that patients seemed to do fairly well in buildings of all sorts and shapes, the architects, when asked to draw plans for hospitals, fell in with prevailing architectural fashion, erected really handsome frontages, often in the form of Grecian temples with elaborate porticos, behind which they crowded together the wards for the sick.

Yet even these hospitals did very well so long as they were not fully used, or were, to a considerable extent, occupied by chronic medical cases.

WHY THE OLD HOSPITALS BROKE DOWN.

Their arrangements broke down, however, as soon as they became crowded or were largely occupied with serious surgical cases.

As an instance of a hospital, which had been healthy under normal conditions, becoming unhealthy under the strain of full occupation, we may refer to that of Chester, given in the report above quoted.

"Dr. Peacock, who some considerable time since, was for several years house-surgeon to the hospital, tells us that for the first two and a half or three years of his tenure of office, serious accidents and injuries were admitted only occasionally, the wards were never overcrowded, and erysipelas and other hospital diseases never occurred in the cases under treatment. During the last twelve or eighteen months of his time, however, the Chester and Crewe and the Chester and Birkenhead Railways were in course of construction, and many serious accidents from them were admitted into the infirmary, so that the wards devoted to their reception were often overcrowded. The wards became in consequence very unhealthy, erysipelas constantly occurred in them and they had to be temporarily closed."

The experience of the Cumberland Infirmary at Carlisle was the same. No cases of pyæmia occurred for several years after its foundation in 1841, but while railways were being made in the neighbourhood and serious accidents became more numerous, the mortality after operations was distinctly increased, and erysipelas and pyæmia prevailed on more than one occasion. Huddersfield Infirmary again had the same experience during the construction of railways.

The teaching of all this is that the actual good results obtained at any hospital tell but little as to the appropriateness of its plan. Any method of construction will do at times; it is under conditions of strain that the badly constructed hospitals break down.

To what then was the strain upon the hospitals due which caused the outcry as to their unhealthiness which was raised by Sir James Simpson and led to the introduction of the word "hospitalism" into hospital literature? The answer is, Chloroform.

THE EFFECT OF ANÆSTHETICS ON THE SALUBRITY OF HOSPITALS.

Until the introduction of anæsthesia, in 1846, no one underwent any operation unless he was absolutely driven to it. The writings of the older surgeons and the older records of the hospitals show that the operations which were performed were operations of necessity—amputations, lithotomies, the removal of malignant tumours, and a few trephinings and ligatures of arteries.

Looking back from these days of absolute anæsthesia and quiescence during operation, one cannot but admire the boldness both of the patient and the surgeon which made it possible to operate at all, when the one had to bear the pain, even to its bitterest extremity, and the other had to perform the delicate manipulations of the operation, however great were the struggles of the patient and however distressing the manifestations of his agony.

Under such circumstances, operative surgery was restricted within the narrowest possible limits. But, with the introduction of anæsthetics, all this was changed; the number of operations which it was possible to perform, and which it was justifiable to advise, was increased every year, and the patients who were willing to submit to the knife, now that they could do so without pain, became innumerable.

This great increase in the operative work of the hospitals seriously affected their salubrity, and the old lesson was enforced again that, for the prevention of erysipelas and pyæmia, light and air and segregation were absolutely essential.

About the same time the terrible experiences of the Crimean war, and the efforts of Florence Nightingale to alleviate the lot of our sick soldiers at Scutari and before Sebastopol, all tended in the same direction, and helped to impress on hospital architects the ever-present necessity of providing light and ventilation far more systematically than had previously been done.

THE PAVILION SYSTEM.

The result was that the pavilion system of hospital construction became generally accepted, and has ever since remained the ideal at which architects have aimed, although with very varying success.

Not all the light and all the air, however, which was so afforded, could overcome the evils which arose from the aggregation of large numbers of patients suffering from open wounds. The civil hospitals, even the best of them, became affected with hospital diseases, which had been looked upon as the special pests of military surgery.

Undoubtedly, the improved methods of construction which were so generally adopted in the hospitals built after the time of the Crimean war had great influence in diminishing the evils of hospitalism; and particularly was this the case where, as was more especially done in some of the German hospitals, the pavilions were constructed only of one storey in height, and were absolutely separated the one from the other by the abolition of all connecting corridors. All surgeons saw that these hospital diseases were infectious, and were carried from patient to patient, and it became increasingly evident that the smaller the groups of patients under one roof the less was the chance of any of these diseases spreading throughout the hospital. Clearly, the chances of any individual becoming infected were lessened, so far as infection was carried by air, by breaking the hospital up into a number of separate buildings, and for a considerable time the shed system of construction had a great vogue.

A REIGN OF TERROR.

But for all that, it was clear that something more than mere aërial infection was at work in producing the gangrene and the pyæmia, which, in an intermittent and apparently causeless manner, again and again ran through the wards of our hospitals.

A general timidity seized upon surgeons, especially in France; a dread arose of clean incisions, and strange methods of operating were invented, such as by the *écraseur*, by the actual cautery, and by the use of *flèches caustiques* (short arrow heads made of chloride of zinc and flour), which were inserted all around the part to be removed, with the object making it slough away.

At the same time an infinite variety of modes of dressing were introduced. Wounds were left absolutely open, or they were covered with water dressing, or they were irrigated by a constant stream of water like a dropping well, or they were covered with absolutely dry cotton wool, or this dressing was combined with pressure. Some surgeons went back to the teaching of the monks of old and closed up all their wounds with friar's balsam, while Chassaignac on the other hand invented the drainage tube. Almost every system succeeded in some cases, and especially in its inventor's hands, only to fail as often in other hands and in other cases.

A PREVISION OF ASEPTIC SURGERY.

Undoubtedly, in many of these methods there was a germ of what we now call antiseptic practice. But the underlying principle was not understood: all was mere guesswork and empiricism, and as no one could give the reason no one could be induced to follow precisely in the steps of his master.

Looking back from these aseptic days to the time of Chassaignac one cannot but see that the efficacy of his methods depended on their cleanliness. He did his own dressings. One assistant carried a basket of snowy charpie, another a bowl of *vin aromatique*, another a solution of nitrate of silver and a number of sticks armed with cotton wool. On

removing the old dressing the drainage tube was seen, as it should be, just projecting from the surface. With clean charpie the surface was wiped; then the part around the tube was dabbed with silver nitrate by means of a clean swab, then taking a great handful of charpie out of the basket and dipping the lower surface of the mass in *vin aromatique*, the whole was placed upon the wound. No sponging, no water, no touching of the wound, and everything clean and fresh for every patient; we need not wonder then that Chassaignac had success in such cases, abscesses especially, as were fitted for drainage. This was aseptic surgery if he had but known it. But like every inventor this great surgeon rode his hobby hard, and it must be added aimlessly; for like all the rest who succeeded here and there, he knew not why success had come.

Amid this chaos arose the next great influence by which the management and even the construction of hospitals was to be affected.

LISTER.

Working in an insalubrious hospital and surrounded by cases of hospital disease, Lister discovered that the cause of these diseases was a living thing, an infective micro-organism. He discovered also that by taking measures to prevent the growth of these micro-organisms suppuration was prevented, wounds could be made to heal by first intention, and that a stop could be put to that reign of terror which the erratic prevalence of hospital diseases had so long imposed upon patients and surgeons alike.

Thus arose the great doctrine on which all modern surgery is based. Some called it "Listerism," affected to look on it as but yet another system added to the effete ones which cumbered medical literature, and threw no small scorn on its inventor when they found that his methods were continually changing. What Lister discovered, however, was not a method but a principle, and it is to the application of that principle far more than to any improvement in hospital construction that the greater safety of hospital patients at the present day is due.

During the past five-and-twenty years a multitude of surgeons, working in a multitude of ways and amid every conceivable variety of surroundings, have been striving to carry out the principles laid down by Lister. Their methods have been different, their aims even have been different so far as some of them have understood their own aims, the materials and the proceedings employed in different countries, in different hands, and at different times, have varied enormously, so that the onlooker might hardly recognise the slightest link connecting the elaborate processes current in the era of the spray with the apparently simple proceedings which are in vogue among those who practise the so-called aseptic surgery. But, all along, the root principle of all these varied methods has been the same, namely, the protection of all wounds from the action of infective organisms.

THE INFLUENCE OF LISTER'S TEACHING UPON HOSPITALS.

Although the first triumphs of antiseptic surgery were won amidst the most terribly septic surroundings, and although the successes then obtained remain still the most striking proofs of the truth of the principles on which the treatment was founded, it was soon made manifest that a still greater success could be attained, and by far simpler methods, when the general broad principle, the truly antiseptic principle, of cleanliness was carried far beyond the mere wound, and was made to include the whole patient, his bed, his nurse, his ward, and in fact the whole hospital in which he lived.

The influence of all this upon the hospitals has been very great. The semi-sweet, semi-fetid smell, in reality a smell of pus in various stages of decomposition, which used to pervade the hospitals of old, gave way to strange and searching odours of carbolic acid, iodoform, and other chemical compounds. The signs of the constant conflict which was going on between septicity and antiseptics were patent to the nostrils of every visitor. But these scents, the smoke, as it were of the battle against germs, have passed away; septicity is kept down by sheer force of cleanliness, and the calm after the storm is typified by the simple purity of atmosphere which is now maintained in the wards of all our best hospitals.

THE TRAINED NURSE.

Intimately connected with these great changes in the inner working of our hospitals has been what, to the outside public, has seemed the greatest change of all, namely, the alteration which has taken place in the character of the nursing and in the *personnel* and position of the nurse.

Perhaps it is not so fully recognised as it should be that the reason for the improved position of the modern nurse is not that she now does better what she did less well before, but that she now does quite fresh things which in old days were not done at all. The *raison d'être* for the trained nurse, whom we now meet in every serious case, is that she carries out the treatment of the patient. Exactly in proportion as the treatment of disease has ceased to be expressible in doses of physic, and has come to include the modification of the whole surroundings of the patient and the carrying out of certain highly technical manœuvres, in proportion in fact as treatment has become continuous, so has it become necessary to have continuously on the spot someone trained in the processes involved. Hence the modern nurse.

THE NURSE OF OLD.

It must not, however, be imagined that the nurse of to-day, except so far as the knowledge of these technical processes is concerned, is so infinitely superior to the nurse of those days sixty years ago. Still, although it is unfair to speak of the nurses of 1837 as "Gamps," they were very different from the nurses of to-day.

In an old parliamentary report into the conditions of the charities of London, which was issued in 1839, we find that in 1835 St. Bartholomew's Hospital had 5,644 inpatients, against 6,474 in 1894. Probably the average number in the wards was about the same.

But how about the nurses? At the present time, including sisters and probationers, the nursing staff at St. Bartholomew's numbers about 250 persons. Sixty years ago, however, or to be precise, in 1835, the sisters and nurses together numbered only 104, there being twenty-nine sisters and seventy-five nurses. This, however, by no means shows the change which has taken place. It is stated that the nurses "perform all the usual duties of servants, in waiting on and cleaning the patients, beds, furniture, wards, and stairs." One wonders where the nursing came in! They evidently occupied much more the position of ward maids than of nurses[1]. Then we are told that "they receive from the steward 7s. each weekly. They are allowed two gowns and a cap per annum, half a loaf, and a pint of beer daily, with the meat from the hospital broth, also a dinner on Sunday." Fifty of the nurses also took night duty by rotation, and for this they ordinarily had 1s. 9d. a week allowed in addition. It was, however, in contemplation, to provide them with "a dinner of meat and potatoes every day, and make the wages of all 8s. 9d. per week."

The sisters also only had a dinner provided for them on the Sundays, at the cost of the hospital. On referring to the rules, we find one to the effect that "no sister or nurse shall go out of the hospital to fetch porter or other liquor after the outward gates are closed."

Doubtless these good women did well and properly the work that was placed in their way; but we recognise how little that way went towards nursing, in the modern sense of the term, when we picture them scrubbing floors and stairs, finding themselves in food, except for the "meat from the broth," and running out for pots of porter at all hours of the day until the "outward gates" were closed. Talking of beer, it is worth noting, that in those days, every woman on meat diet had a pint of beer and every man two pints of beer a-day.

NEW INFLUENCES IN HOSPITAL CONSTRUCTION.

To return to the question of hospital construction, we see in the introduction of modern systems of nursing, and in the general acceptance of the principles enunciated by Lister, two influences which are sure to tell and indeed have begun to tell upon the architectural mind, and are likely in the future to lead to considerable modifications in the prevalent

[1] A search through the table of expenses of that date shows no sign of any other female servants except in the kitchen and laundry departments.

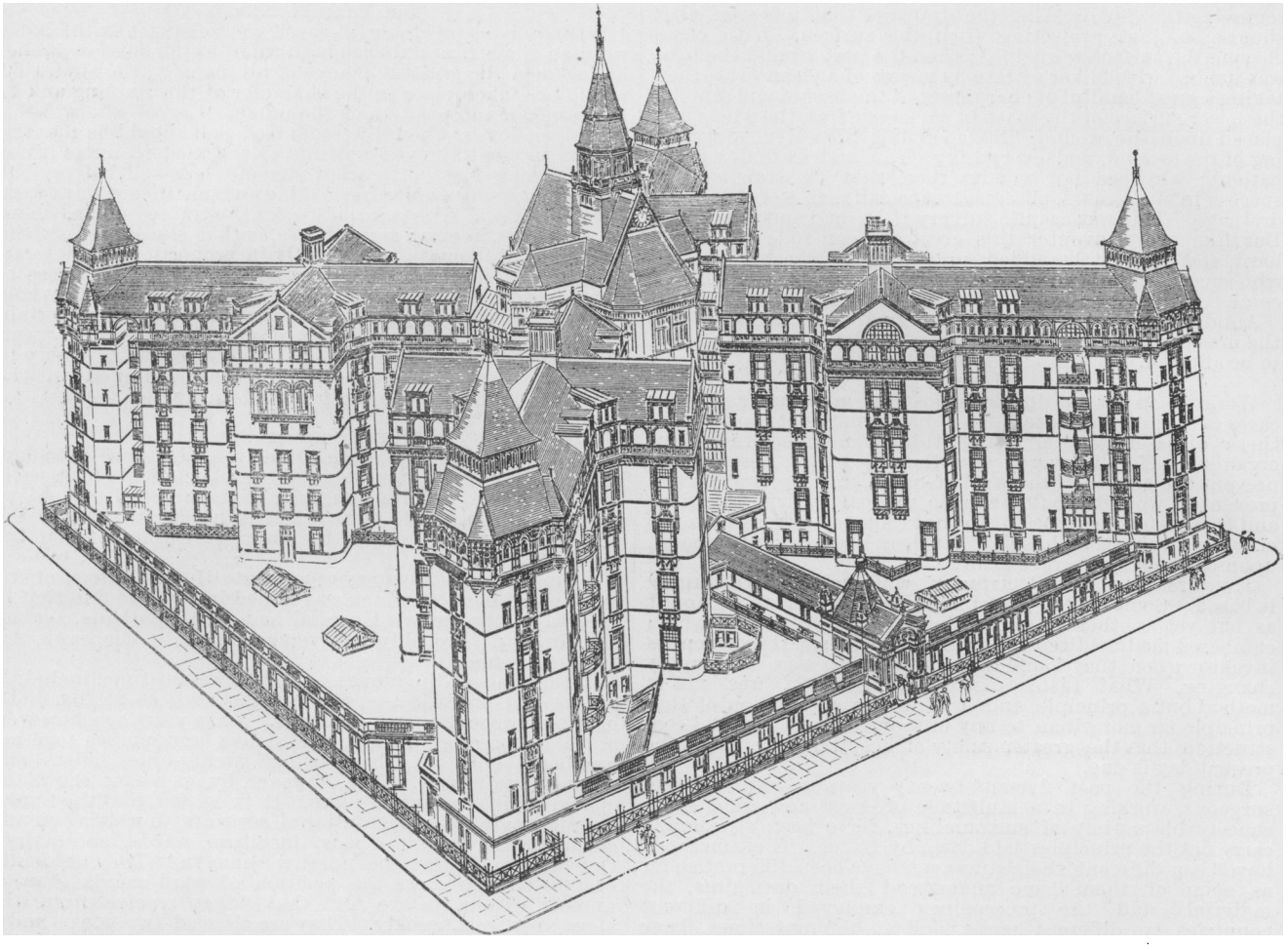

Fig. 1.—University College Hospital (about to be erected).

type of hospital building. A reaction is already visible in regard to the size of the ward. It had been laid down as a sort of axiom that a ward of thirty or thirty-two beds was a good working unit so far as nursing was concerned, but with the growing proportion of nurses to patients which is now looked upon as desirable there is an evident tendency to build smaller wards. Again, with the experience of the last quarter of a century, it has become abundantly clear that while the most perfectly constructed hospitals may become unhealthy with defective management, a careful attention to antiseptic precautions may make it possible to get good results in the midst of the strangest surroundings. Architects have recognised this and have not been slow to advocate a return to a more solid and connected type of building. For thirty years past they have been driven, much against the grain, to erect isolated pavilions, but now in view of the demand for smaller wards and the evident efficacy of modern surgical proceedings in preventing the evils which used to arise from the aggregation of patients—and in view also, be it said, of the apparent success of forced mechanical ventilation in preventing the intermingling of the air even from contiguous wards—a strong tendency is showing itself to revert to a more concentrated and "architectural" style of hospital construction.

MECHANICAL VENTILATION.

Forced ventilation has no doubt earned for itself a bad name in the history of hospitals. Instance after instance has been adduced in which the most elaborate plans for artificial ventilation have failed and in which recourse to open windows has been attended with the happiest results. But then it may be questioned whether many of the failures which have occurred have not been due to an under-estimation of the mechanical power required and of the size of the airways which are necessary. The introduction of large airways and of engine power in place of chimney draught has made a considerable difference in the position of the question, and there can be little doubt about the success of some of the more recent examples of mechanical ventilation. The Glasgow Victoria Infirmary may be taken as an example of what has been done in the direction of supplying the wards of a hospital with warmed and filtered air on the plenum system, and the new General Hospital which is shortly to be opened at Birmingham will be ventilated on the same plan. While then there is no doubt that architects will endeavour to retain one characteristic of the pavilion system, namely, the large amount of light which it provides for the inmates, there are indications that they will in future feel less tied down than in the past to that scattered form of construction which has of late years been so generally adopted.

OLD AND NEW BUILDINGS.

To show the sort of building which architects at the beginning of the reign felt themselves justified in erecting, we give a plan (Fig. 2) of an English hospital, founded not many years after the Queen came to the Throne. It will be seen how the wards were massed together. They were large and lofty, allowing a good cubic space per patient, but from the manner in which they were arranged isolation was impossible. Bristowe and Holmes say, in their Report, "The ventilation is, from the construction of the hospital, necessarily imperfect. The plan on which

the hospital is built we think defective. The wards, with one exception, have windows on one side only,[2] they communicate with one another, and indeed would appear to have all the defects of the corridor system of building without the advantage of the corridor itself."

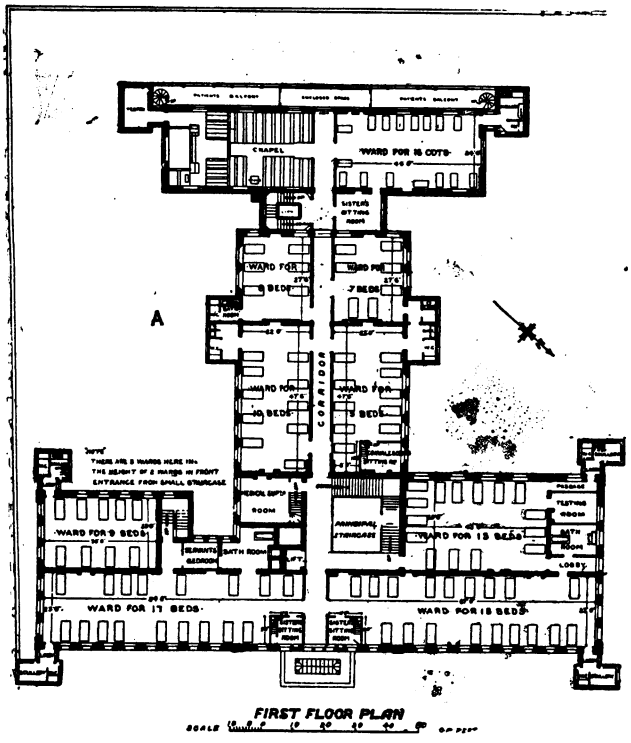

Fig. 2.—An early Victorian hospital.

We do not think it necessary to give any illustration of the familiar oblong pavilion type, but would mention that while in the earlier examples of this system of construction the wards were built close up to the connecting corridors, the tendency has been of late years to interpose a short passage between corridor and ward. In many hospitals also the corridor has been done away with, either being reduced to a mere covered way, as in the new hospitals of the Metropolitan Asylums Board, or absolutely abolished, as in many German hospitals.

As an example of the most recent development of views as to hospital construction and as showing what the pavilion system is capable of, even on a comparatively contracted site, we give sketch plans (Fig. 3 and Fig. 4), and an elevation (Fig. 1) of the new University College Hospital; plans, however, which are subject to certain modifications. No doubt, the shape of the plot of land was a dominating influence in the evolution of the scheme, but it will be noticed how carefully the wards are isolated from each other, while on the other hand space is gained by their cruciform shape.

The problem of hospital construction in towns is greatly complicated by the dearness of land, and it is absolutely necessary to build high. The evils of piling ward upon ward, however, seem not to depend so much upon the fact of one ward being over another as upon their all being connected with a staircase, where a general intermingling of the air takes place. In this new hospital, however, the greatest care is taken to separate all the wards from the staircase by carrying the connecting passages on bridges, by which means also free circulation of the outer surrounding air is much facilitated. Although the cruciform wards will look very different from the long flat-walled rooms to which we are so accustomed, the whole hospital is planned in strict adherence

[2] It should be noted that the original building ended at the point marked A, all behind being a later addition, and also that in the original building the sanitary towers which now project from the four corners of the front block did not exist.

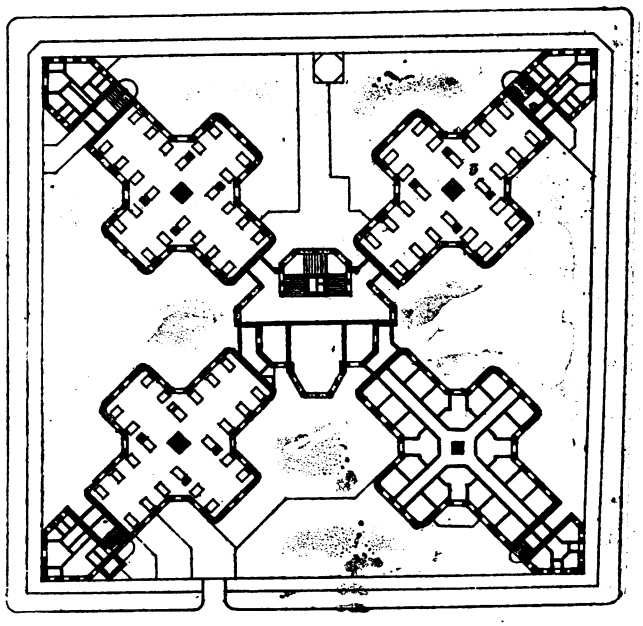

Fig. 3.—University College Hospital (about to be erected). General plan.

to those elementary principles which have been the cause of the great success of the pavilion system of construction, namely, the provision of light and air on every side, and the breaking up of the hospital into a series of wards having no connection with each other except by means of corridors, which are practically open to the outer air. As a contrast, we give a plan of the hospital as it is (Fig. 5).

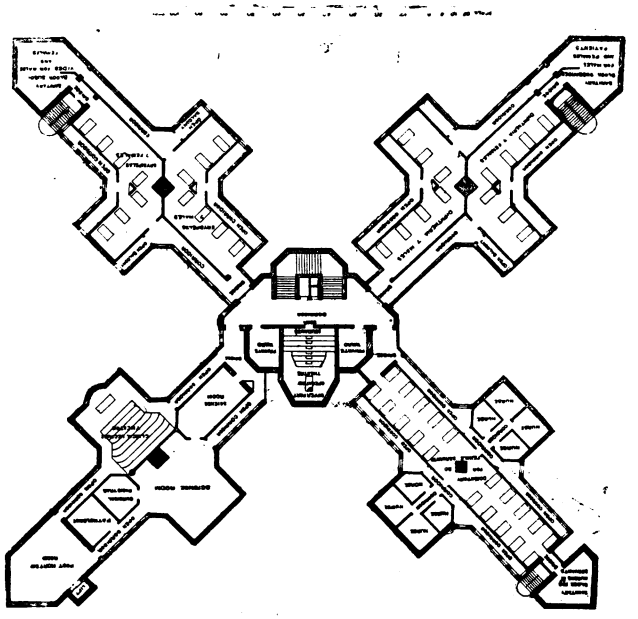

Fig. 4.—University College Hospital (about to be erected). Top floor.

These principles, we believe, cannot be safely departed from, unless by the introduction of a purely mechanical system of forced ventilation; and it will be an interesting thing, and a vastly important matter to the future of hospital construction, to compare the progress and the success of the General Hospital, Birmingham, and the University College Hospital, London—two noble monuments of the position to which hospital construction has arrived at this end of this

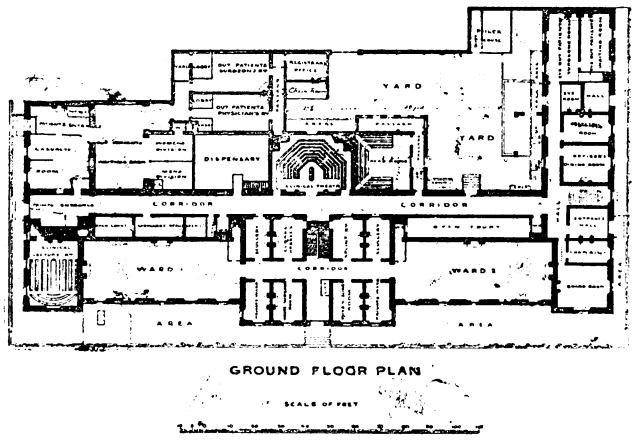

Fig. 5.—University College Hospital (about to be pulled down).

progressive century. The advance since the beginning of the century, the advance even in the sixty years of the Queen's reign, has been immense. Yet we cannot but feel that the problem is unsolved, and that we stand at the parting of the ways. Shall we trust to the engine and the fan; shall we secure—as by mechanical appliances no doubt we can, absolutely and with certainty—that every patient shall be supplied with fresh air, and that air once used shall pass away, meanwhile risking the utter failure of the whole arrangement if the engine should but break down for a single hour; or shall we leave the ventilation to natural means, trusting for safety to so planning the building as entirely to prevent air ever passing from one ward to another? This is the great problem which now awaits solution.

THE HEALTH OF THE WORKING CLASSES.

AMONG the satisfactory consequences of Parliamentary legislation effected during Her Majesty's reign may be mentioned the more humane treatment of children, the greater respect shown in our industries for human life, and the generally improved conditions under which our working classes live. When the Queen ascended the throne in 1837, the conditions of labour—for example, in our coal mines—were such as can scarcely now be mentioned without calling forth expressions of regret that to human lives spent in such hard toil there should have been extended so little sympathy and respect.

INDUSTRIAL PROGRESS.

The close of the Napoleonic wars and the peace thereby insured to Europe allowed Britain to turn her thoughts inwards and give attention to the development of her own resources. The Victorian era will long be remembered as that in which we as a nation attained commercial supremacy, and our country as that above all others in which the social conscience was first awakened to a due sense of appreciation of the value of human life, and of the necessity for placing a limit to the hours of toil. Owing to the employment of steam and the more frequent use of machinery, labour sixty years ago had become more productive, and new trades were developing. At the date of the Accession home industries were prevalent, and many of them were prosperous. The quietude so noticeable in many of our villages to-day was then broken by the sound of the shuttle and the fall of the hammer; but, as machine-made goods began to replace those made by hand, large factories sprang up in our towns and cheapened production, a larger circulation of money, and increasing demand, stimulated output and promoted consumption. A wave of commercial prosperity passed over the country, male and female labour was absorbed into the factories, and thus was encouraged the rise of large towns at the expense of our rural population, and a period of industrial prosperity inaugurated unexampled in the annals of history. Whilst the development of the factory system is not an unmixed blessing, the industrial progress already alluded to could scarcely have been possible had it not been for the many national advantages we possess—such as our extensive seaboard, a rapidly increasing population supplying cheap labour, and our extensive mineral deposits. Fortunately Great Britain was rich in coal. We do not err when we say that the home consumption of coal is a measure of our own industrial activity, and that the amount of coal raised in this and other countries is an index of trade generally. At the beginning of this century only 10,000,000 tons of coal were raised, but in 1895 189,652,562 tons were raised, and in 1896 the output of coal was the highest ever recorded, 195,000,000 tons.

COAL MINES.

It could scarcely be expected that the working classes would be prepared either to enjoy or to utilise to the full all the advantages which an increased prosperity was bringing. Social life ameliorates but slowly. Improved environment is one factor which makes for human betterment. Wherever it has had the opportunity of operating there has been progress, but in no industrial community has this been more manifest than amongst our colliery population. Work in a coal mine is admitted to be hard and hazardous. What plea, therefore, can be offered in extenuation of a custom which within the memory of living man not only allowed, but encouraged, the employment of children of tender years in coal pits? Miners are still following their occupation who tell of the time when at 7 or 8 years of age they were taken underground to work for twelve to fourteen hours a day, compelled to sit in utter darkness, often in wet and unwholesome places, their allotted task being to open and close the doors, that formed part of the means for ventilating the passages, to allow of the empty or laden coal tubs passing. During many months in the year such children only saw daylight once a week—on Sunday. Women fared little better, particularly when they worked underground. Almost naked, they were compelled to carry loads of coal upon their backs, or harnessed like beasts of burden were forced to drag heavily-ladened trucks. At the present day it is almost impossible to realise that such were some of the conditions of life and labour sixty years ago.

EXPLOSIONS.

In the early part of this century explosions in coal mines were frequent and the loss of life great, but as there was no Government inspection, and no daily press to voice public opinion, enlist sympathy, and disseminate information, facts were concealed, individual expression stifled, and a condition of things was allowed for which no single person was held responsible. It is impossible to estimate accurately the amount of human life lost underground in the first twenty years of this century, or how preventable many of the accidents might have been, but so frequent had explosions become, and so severe their consequences, that after numerous unsuccessful efforts had been made to deal with miners working with naked lights in an atmosphere impregnated with inflammable gas, an appeal was made by the Sunderland "Society for the Prevention of Accidents in Coal Mines," to Sir Humphry Davy, requesting him to solve the problem. In 1815 he gave to the pitman the "safety" lamp. Whilst the "Davy" is considered the safest of lamps for ordinary mining purposes, it is interesting to know that the individual who first drew attention to the necessity for the abolition of naked light in coal pits, and for substituting an insulated miner's light, was a member of our own profession—Dr. Clanny, of Sunderland.

At the commencement of the Queen's reign the "Davy" lamp was already in use in mines, but as the upper seams of coal were being worked out it became necessary for colliery owners to sink their shafts deeper, and just in proportion as strata were reached further and further from the surface, so did the dangers of mining increase. The deeper seams of coal are more fiery, and are therefore more liable to be the seat of explosion.

"CHILD SLAVERY."

At the present time the working of a colliery is a marvel of precision and safety compared to what it was sixty years ago. There are still many capitalists who resent Government interference with mining operations, and who consider all restrictions as vexatious; but whilst we admit that it is in mining matters that the State has shown its hand most, we are bound to acknowledge that legislation and inspection